PENGARUH CAMPURAN RESIN *POLYESTER* DAN *VINYLESTER* TERHADAP SIFAT FISIK DAN MEKANIK BERPENGUAT SERAT SABUT KELAPA

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh campuran resin *polyester* dan *vinylester* terhadap sifat fisik dan mekanik komposit berpenguat serat sabut kelapa. Serat sabut kelapa dipilih karena ketersediaannya yang melimpah namun pemanfaatannya masih terbatas. Komposit dibuat menggunakan metode *hand lay-up* dengan matriks campuran 70% resin *polyester* dan 30% resin vinylester, serta variasi fraksi volume serat 0%, 5%, 10%, 15%, dan 25% (PV0–PV25). Pengujian mekanik dilakukan menggunakan Universal Testing Machine mengacu pada standar ASTM D638, dan karakterisasi morfologi patahan dilakukan menggunakan Scanning Electron Microscope (SEM). Hasil pengujian menunjukkan bahwa spesimen PV0 memiliki sifat mekanik tertinggi dengan Tensile Strength 32,30 MPa, Yield Strength 26,95 MPa, Elongation at Yield 2,28%, dan Tensile Stress at Break 11,95 MPa. Penambahan serat sabut kelapa justru menurunkan sifat mekanik komposit, yang didukung oleh hasil SEM yang menunjukkan adanya fiber pull-out dan void pada spesimen berserat. Hasil ini menunjukkan bahwa kualitas ikatan antarmuka serat-matriks dan minimnya cacat mikro lebih menentukan performa mekanik komposit dibandingkan jumlah fraksi serat yang ditambahkan.

Kata kunci: komposit, serat sabut kelapa, resin *polyester*, resin vinylester, sifat mekanik, SEM

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ABSTRACT

This study aims to determine the effect of *polyester* and *vinylester* resin blends on the physical and mechanical properties of coconut coir fiber-reinforced *Composite*s. Coconut coir fiber was selected due to its abundant availability, although its utilization remains limited. *Composite*s were fabricated using the hand lay-up method with a matrix blend of 70% *polyester* resin and 30% *vinylester* resin, with fiber volume fractions of 0%, 5%, 10%, 15%, and 25% (PV0–PV25). Mechanical testing was conducted using a Universal Testing Machine referring to the ASTM D638 standard, while fracture morphology was characterized using Scanning Electron Microscopy (SEM). The results showed that the PV0 specimen exhibited the highest mechanical properties, with a Tensile Strength of 32.30 MPa, Yield Strength of 26.95 MPa, Elongation at Yield of 2.28%, and Tensile Stress at Break of 11.95 MPa. The addition of coconut coir fiber instead reduced the *Composite*'s mechanical properties, supported by SEM results revealing fiber pull-out and void formation in the fiber-reinforced specimens. These findings indicate that the quality of fiber-matrix interfacial bonding and the minimization of microdefects play a more critical role in determining mechanical performance than the fiber volume fraction itself.

Keywords: *Composite*, coconut coir fiber, *polyester* resin, *vinylester* resin, mechanical properties, SEM